PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

	Date of mailing *(day/month/year)* see form PCT/ISA/210 (second sheet)
Applicant's or agent's file reference see form PCT/ISA/220	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB2006/000782	03.03.2006	04.03.2005

International Patent Classification (IPC) or both national classification and IPC
INV. H04B7/185 H01Q1/28 H01Q1/08 H01Q1/12 H01Q21/06 H01Q1/42 B64G1/10

Applicant
EADS ASTRIUM LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:	Date of completion of this opinion	Authorized Officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	see form PCT/ISA/210	van Norel, J Telephone No. +49 89 2399-2181

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

      ☐ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material:

      ☐ on paper

      ☐ in electronic form

   c. time of filing/furnishing:

      ☐ contained in the international application as filed.

      ☐ filed together with the international application in electronic form.

      ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of

☐ the entire international application

☒ claims Nos. 19,20

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international search *(specify)*:

☒ the description, claims or drawings *(indicate particular elements below)* or said claims Nos. 19,20 are so unclear that no meaningful opinion could be formed *(specify)*:

see separate sheet

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed *(specify)*:

☐ no international search report has been established for the whole application or for said claims Nos.

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

- ☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
- ☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
- ☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13*ter*.1(a) or (b).

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions, and such tables were not available to the International Searching Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See Supplemental Box for further details

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	4,5,10,11,13,15-18
	No:	Claims	1-3,6-9,12,14
Inventive step (IS)	Yes:	Claims	15-18
	No:	Claims	4,5,10,11,13
Industrial applicability (IA)	Yes:	Claims	1-18
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re item III (no examination):

1. No examination of claims 19 and 20 as to novelty, inventive step and industrial applicability, because these claims rely on references to the drawings, contrary to the requirements of Rule 6.2(a) PCT.

Re item V (reasoned statement):

1. Reference is made to the following document; the numbering will be adhered to in the rest of the procedure:

   D1= US-B1-6 505 381

2. The subject-matter of **claim 1** is not new (Article 33 (2) PCT).

   D1 discloses a phased array antenna (100, see D1, Figs. 1 -3 and col. 2, line 57, noting that the array antenna being a phased array antenna is considered a trivial feature), deployable from a retracted condition to a deployed condition, comprising a base member (110) having, at least in part, a polygonal cross-sectional form defined by a plurality of edge regions, and a plurality of antenna panels (120, 130), each antenna panel being connected, by a respective hinge means (150), to a respective one of the edge regions of the base member (110), such that, in the retracted condition, two or more of the antenna panels are stacked one on top of the other on the base member, and the hinge means being such that the antenna panels (120, 130) can be hinged sequentially one after the other from the stack to a position in which each panel is adjacent a respective base edge region to provide the deployed condition wherein the phased array antenna (100) provides an extended area.

   Hence, D1 discloses an antenna having all the features of present claim 1.

3. Moreover, D1 anticipates also the subject-matter of the following claims of the present application:

Claim 2:
Each antenna panel (120,130) is generally the same cross-sectional shape as the base member (110).

Claim 3:
Each antenna panel is hexagonal in shape (D1, col. 3, lines 38-43).

Claim 6:
The antenna panels are arranged such that when they are moved from the stack to the fully deployed position an edge of the panel is located adjacent to and coterminous with a respective edge of the base member (D1, Fig. 8).

Claim 7:
Side edges of each deployed panel extending from the base member are adjacent respective side edges of adjacent panels (implicitly disclosed in D1, col. 3, lines 38-43).

Claim 8:
Each antenna panel is coupled to the base member by means of a back flap hinge (150), having a pivot comprising an extended sleeve (300) and rotatable pin (310) therein, and a frame (200) extending from the pin (310) and secured to the rear side of the antenna panel (120) (D1, col. 4, lines 23-25).

Claim 9:
Each antenna panel (120,130) is coupled to the base member (110) by means of a hinge (150) wherein the mounting point of the hinge (150) is such in relation to the position of the panel (120,130) within the stack in the retracted condition that when the hinge (150) is rotated about the pivot point the respective panel (120,130) from the deployed condition is coplanar with the other antenna panels (120,130; see D1, Fig. 1).

Claim 12:
D1, col. 2, line 57 and col. 3, lines 39-41, discloses an antenna array comprising regularly configured sub-arrays, being hexagonal and comprising radiating elements.

Claim 14:
The upper surface of the base member (110) provides a central antenna panel (D1, Fig. 2).

4. Claims 4, 5, 10, 11 and 13 do not appear to contain any additional features which, in combination with the features of any of above claims to which they refer, meet the requirements of the PCT with respect to inventive step. They are either known from D1 or they are considered to be common design measures.

Claims 4 and 13:
D1, col. 2, line 61 indicates using different forms of antenna panels. It is an obvious design option for a person skilled in the art to have a castellated outer edge.

Claim 5:
No invention can be seen in the antenna arrangement specified in claim 5 since the antenna panel mounted on the opposite side of the base member to the stack in retracted position has no surprising effect.

Claim 10:
It is an entirely self-evident approach for the person skilled in the art to increment the mounting point of the hinge for sequential panels in the stack, by half the thickness of the antenna panel in the stack.

Claim 11:
Claim 11 is related to the problem of the provision of an electrical connection between the base member and the antenna elements within each panel. Including electrical connectors disposed along adjacent edges is, however, an obvious solution.

5. Notwithstanding the above novelty and inventive step objections, it appears that the additional features of **claims 15 and 16**, which are dependent on claim 1, and the subject-matter of **claim 17** and the additional features of dependent **claim 18** are new and involve an inventive step.

Re item VII (certain defects):

1. It is to be noted that a positive Examination Report will not be possible unless a single independent claim (see VIII, 1 below) is technically distinguished from the prior art disclosed in D1.

   The independent claim should comprise concrete, nonspeculative terminology clearly related to the disclosed embodiment (e.g. claim 17, page 9, lines 9-18, Figs. 3A-3C). The wording of such an independent claim should reflect clearly the distinctions between the present invention (see V, 5 above) and what is known in the art, as disclosed in D1.

2. To meet the requirements of Rule 6.3(b) PCT, the independent claim should be properly cast in the two part form, with those features which are part of the prior art (see D1) being placed in the preamble (Rule 6.3(b)(i) PCT) and the subject-matter, for which protection is sought, being placed in the characterising portion (Rule 6.3(b)(ii) PCT).
   The remaining claims should be adapted to this new claim.

3. It appears appropriate to incorporate reference numerals in the claims to features in the drawings. The technical features of the claims would be rendered more intelligible by relating these features to the corresponding features of the drawings (Rule 6.2(b) PCT). This applies to both the preamble and characterising portion.

4. The opening pages of the description should be brought into line with the new independent claim (Rule 5.1(a) (iii) PCT).

5. In order to indicate more completely the background art useful for understanding the invention, the abovementioned document D1 should be acknowledged in the description (Rule 5.1(a)(ii) PCT).

6. As a precaution, care should be taken to avoid giving rise to objection under Articles 34(2)(b) and 41(2) PCT by the inadvertent addition or deletion of subject-matter

which extends the content of the application beyond that of the application as filed.

7. In order to facilitate the examination of the conformity of the amended application with the requirements of Article 34(2)(b) PCT, the applicant is requested to clearly identify the amendments carried out, and to indicate the passages of the application as filed on which these amendments are based (see also Rule 66.8(a) PCT).

Re item VIII (certain observations):

1. The presentation of two independent claims in the same (apparatus) category, namely claims 1 and 17 gives rise to two objections under Article 6 PCT, i. e. lack of conciseness and lack of clarity.
As to conciseness, reference is made to the established practice that the requirement of conciseness applies not only to individual claims but to the claims as a whole. Rule 6.1(a) PCT reinforces this conclusion. The lack of clarity derives from the consideration that the prime function of the claims is to make clear what are the essential technical features of the matter for which protection is sought (cf. the first sentence of Article 6 PCT).
Present claims 1 and 17 appear to provide two differently expressed versions of essentially the same broad features. These two alternative definitions leave the reader in doubt as to what are in fact the essential features and hence the primary purpose of Article 6 PCT is not satisfied.

   Indeed, the various terminologies used to introduce the two independent claims confuse the precise scope of the monopoly sought, and suggest the presence of more than one invention, in violation of Rule 13 PCT. It thus appears necessary for the Applicants to present **a single independent claim** in the apparatus category, with appendant claims as appropriate to cover the Applicants' preferred embodiments.

2. The obviously unnecessary statement "...without departure from the spirit and scope of the invention" in the description at page 12, lines 10 and 11 should be deleted (Rule 9.1 (iv) PCT).

3. It is noted that the expressions "generally" used in claim 2 and "preferably" used in claim 12 have no limiting effect on the scope of these claims, that is to say, the features following these expressions are to be regarded as entirely optional (cf. PCT/GL/ISPE/1 5.40).

4. The following point should also receive the Applicants' attention: on page 5, line 31, "Figures 2A to 2F" should be changed to "Figures 2A to 2G".

5. The application does not meet the requirements of Article 6 PCT, because claim 9 and Figures 2F, 2G and 6 are not clear.

5.1 **Claim 9** does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the mounting point of the hinge in terms of the result to be achieved, which merely amounts to a statement of the underlying problem (i.e. how to achieve that the respective panel from the deployed condition is coplanar with the other antenna panels when the hinge is rotated about the pivot point), without providing the technical features necessary for achieving this result. Such a formulation is not allowable because it appears possible to define the subject-matter in more concrete terms, i.e. in terms of how the effect is to be achieved, described on page 8, line 18 - page 9, line 2.

5.2 There appears to be the following contradiction:
Figures 2F and 2G show that the panels 14.5 and 14.6 are adjacent to each other. However, **Figure 6** shows that panels 14.5 and 14.6 are opposite to each other after deployment and separated by the central unit. Thus, Figures 2F, 2G and 6 are not clear.